

## LIFE-CYCLE TEST SYSTEM FOR AIR POLLUTION ABATEMENT

### Project Description

The U.S. Department of Energy's field center in Pittsburgh has designed and built a versatile research facility called the Life-Cycle Test System (LCTS). The LCTS is capable of evaluating various dry, regenerable sorbent flue-gas-cleanup processes in a continuous mode of operation.

The combustor for the LCTS can be fired with natural gas, which preheats the absorber and associated vessels, and prevents condensation of corrosive flue-gas components such as sulfuric acid during heat-up. It can also burn approximately 40 pounds of pulverized coal per hour, resulting in a flue gas laden with various pollutants.

The LCTS operates this way: the flue gas exiting the LCTS combustor passes through a heat exchanger to maintain a prescribed inlet temperature to the absorber. The absorber is a reactor that contains a sorbent capable of chemically removing some of the pollutants from the flue gas. Depending on the sorbent investigated, ammonia can be injected to facilitate the catalytic reduction of nitrogen oxides (NOx) to nitrogen and water vapor in the absorber. At the end of the combustor process, the flue gas is cooled and then passed through a baghouse so that any residual flyash can be removed.

### Program Goal

Coal represents 94% of proven U.S. fossil fuel reserves, but burning coal for energy generation produces harmful emissions such as sulfur dioxide (SO<sub>2</sub>) and NOx, which are associated with acid rain. It is in our Nation's interest to increase the use of this energy source, but to do so in a way that minimizes adverse impact on the environment.

By providing a means by which to evaluate our most promising air-pollution-abatement processes, the Life-Cycle Test System project will help DOE meet its goal of developing by 2010 power systems that are at least 10 times cleaner and at least 50% more efficient than today's plants.

### Project Benefits

- The LCTS has evolved as a multipurpose, versatile research facility.
- The LCTS unit can be used to investigate various other processes for abatement of SO<sub>2</sub>, NOx, particulates, and/or air toxics emissions.
- Both sorbent performance and operational performance of a particular pollution-abatement process can be optimized in the LCTS to help obtain the extremely high emissions-control goals of the DOE Flue Gas Cleanup program.
- The LCTS offers industry the opportunity to further develop flue gas cleanup technologies through cooperative ventures with the government (CRADAs).

### CONTACT POINT

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